

of the Statistical Society for June 1866, p. 282), I endeavoured to show that it was only the excessive difficulty of determining the character of the functions involved, which prevented economy from taking the mathematical form and standing proper to it. There is little doubt as to the principles of the subject; but when we try to put them into figures, the data are found to be so deficient, complicated, variable, and subject to disturbances of all kinds, that any hope of accuracy soon dies away in most cases. In the above experiments I have attempted to determine the exact character of the functions connecting the amount of work done with the intensity and duration of labour in certain simple cases. These cases, however unimportant in themselves, represent principles which have innumerable applications in common life.

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THE NEW ZEALAND INSTITUTE

Transactions and Proceedings of the New Zealand Institute, 1868. Vol. I. Edited and published under the authority of the Board of Governors of the Institute, by James Hector, M.D., F.R.S., Wellington. (London: Trübner and Co.)

OUR brother philosophers at the Antipodes have set us an example that we should do well to follow in this country; those who reside at head-quarters (Wellington) and who form the New Zealand Institute, having affiliated to themselves under a special Act of the Legislative Government, the various other societies engaged in similar pursuits that exist in the New Zealand Islands; and who in consequence transmit their papers, or abstracts of them, to the Institute for incorporation in their Transactions. It is to such an organisation as this that we must look for relief from the overwhelming pressure of miscellaneous scientific literature under which the British naturalist now groans. No matter what branch of science he affects, or in how narrow a groove of it he walks, the number of Transactions, Proceedings, Journals, &c., with which he must keep *au courant*, is the great obstacle to his progress; and if he at all takes a broad view of his science, he must be content that it should be a superficial one, and increasingly so as new societies and journals spring into being.

The rules and statutes of the New Zealand Institute appear to be under parliamentary control, and have little analogy with the charters of our free-born societies:—they were published in the *New Zealand Gazette* of March 9, 1868, and the following is a summary of them:—

Art. 1. Any society desirous of incorporation must consist of twenty-five or more members, and subscribe 50*l.* annually for the promotion of the branch of knowledge it professes.

Art. 2. Incorporation ceases on the failure of these conditions.

Art. 3. Any such society must expend either one-third of its annual revenues in or towards the support of a local library or museum, or one-sixth of its revenues to the extension and maintenance of the museum and library of the Institute.

Art. 4. Failure of this condition is followed by cessation of incorporation.

Art. 5. All papers read at such societies shall be re-

garded as communications to the Institute, and be published by it, under the following regulations:—

(a) The publication shall consist of a current abstract of the proceedings of the incorporated societies, and of papers read before them; and shall be entitled "Transactions of the New Zealand Institute."

(b) The Institute has the power to reject papers, but (c) must return them. (d) A proportional contribution for the cost of publishing the Transactions may be demanded of the societies in respect of the papers they contribute; and (e) a proportional number of copies of the Transactions will be sent to each society; which may also (f) have as many copies as it pleases, at cost price.

Art. 6. Funds and properties derived from the societies shall be vested in the Institute, and applied by its governors to public uses.

Art. 7. The incorporated societies shall conduct their own affairs, making their own bye-laws, &c.

Art. 8. Certificates of incorporation are granted upon application and compliance with the foregoing conditions, under the seal of the Institute.

The museum and library of the Institute are under the management of the Board of Governors; the laboratory is under the exclusive management of the manager of the Institute.

The governors are nine in number: the official ones are the Governor of the Colony, the Colonial Secretary, and the Superintendent of Wellington; joined to six men, eminent for their scientific attainments or love of science; amongst whom are Dr. Hector, who is likewise manager, and the Hon. Col. Haultain, who is likewise hon. secretary and treasurer. There are four affiliated societies: the Wellington Philosophical Society, the Auckland Institute, the Philosophical Institute of Canterbury, and the Westland Naturalists' and Acclimatisation Society.

With regard to the contents of this first volume, it opens with a capital purpose-like address from the Governor, Sir. G. Bowen, which is followed by a series of papers, for the most part of very great scientific value and interest, and which give a very favourable idea indeed of the spread of scientific knowledge in the Colony, and the number of earnest workers it contains.

Of these, those comprising the Transactions contain no fewer than twenty-two articles on Geology, Physics, Botany, Ornithology, Applied Sciences, Wave and Earthquake phenomena, &c.; these are followed by thirty-nine papers and verbal descriptions of scientific phenomena; and these again by ten essays of great research and merit, respectively entitled:—

"On the Geographical Botany of New Zealand," "On the Leading Features of the Geographical Botany of the Provinces of Nelson and Marlborough," "Remarks on a Comparison of the General Features of the Flora of the Provinces of Nelson and Marlborough, with that of Canterbury," "Sketch of the Botany of Otago," "On the Ornithology of New Zealand," "On the Botany, Geographic and Economic, of the North Island of New Zealand," "On the Cultivation and Acclimatisation of Trees and Plants," "On the Geology of the North Island of New Zealand," "Short sketch of the Maori Races," "On the Maori Races."

The last of these is the result of the life-long labours of one of the most accomplished and industrious of the early missionary settlers in the North Island, Mr. Colenso; whose botanical researches have been as important as his

ethnological labours. The typography of the work is very good, but the illustrations are unequal, and often much larger than they need be for all they demonstrate.

From such an excellent beginning who can doubt that important results will quickly follow? To us the experiment of affiliation is a very interesting one, the success of which we hope to witness. That there are in the New Zealand scheme sources of failure is obvious, but we see none which may not be overcome by firmness, judgment, and singleness of purpose, on the part of the head Institute, and by the avoidance of petty jealousies, and a due regard to the interests of Science on that of the affiliated societies. The power vested in the governors of rejecting unfit papers is a most valuable one, if conscientiously exercised; it cannot be too vigilantly watched by the contributors to the Institute, nor too carefully conducted by the governors. In this country the power vested in the councils of our societies, of suppressing papers on the advice of competent referees, works on the whole well, though we could indicate societies, and some of high position, too, which have quite recently published in their Transactions worthless matter, that has evidently never been examined by a council, nor reported on by competent advisers; thus squandering the property of the members, and doing discredit to the science which the members represent.

Is it too much to expect that our powerful and comparatively wealthy societies should affiliate some of their weaker brethren, who devote themselves to the same branches of science? applying their own tests to the admission of contributions to their Transactions, and leaving to lesser societies the freedom to govern themselves as they think best. Of such an affiliation many of the lesser societies would be proud, and the greater could not but benefit by the arrangement.

To one other point only we shall allude in reference to the Transactions of the New Zealand Institute, viz., the advisability of breaking it up, now or at some future time, into series treating of certain branches of science, for the convenience both of workers and purchasers. By so doing, the members would set another example well worth following by some of the oldest, gravest, and most learned of the English, Irish, and Scotch scientific bodies, which publish ponderous quartos of mixed sciences, that are worth neither their shelf-room nor their cost of binding to the mass of the members and purchasers. But we shudder at the thought of suggesting to such august bodies as the Royal Societies of London and Edinburgh, or the Linnean Society, or the Royal Irish Academy, the propriety of breaking up their Transactions into series confined to definite branches of science, and husbanding their funds by giving to their members and correspondents such only as they care to have.

OTHER WORLDS THAN OURS

Other Worlds than Ours. By R. A. Proctor. (Longmans, 1870.)

THAT Mr. Proctor could write, if he were so disposed, an excellent and instructive book on certain branches of Modern Astronomy, we have no manner of doubt; but for the successful accomplishment of such a work, it

would be necessary, in the first instance, to settle in his own mind what particular classes of persons the work was intended to suit; and, in the second place, it would be essential for the author to allow himself sufficient time for the completion of his project. It is from a failure in these two particulars that what would otherwise have been a truly remarkable book, is brought down to a level much below Mr. Proctor's actual abilities.

A large portion of the book is devoted to the not very fruitful question of the habitability of the planets or their satellites by beings not generically very different from the human race; but we do not think the question in Mr. Proctor's hands is advanced on either side of the argument, materially beyond where Whewell and Brewster left it. The chief novelty consists in the hypothesis that Jupiter and Saturn may possibly serve as suns to at least some of their satellites; and, by the partial emission of heat (and light?), may compensate for the extreme remoteness of the central orb of the solar system. We can neither follow nor admit the validity or consistency of Mr. Proctor's arguments. The question whether the larger planets have or have not as yet cooled down, by radiation, to a sort of normal temperature, is one of considerable interest, and lies within the scope of astronomical physics; but we cannot say that Mr. Proctor's remarks either remove or elucidate the difficulties of the points at issue. On the contrary he speaks fitfully, and hesitates between doubt and something bordering on dogmatism. For instance, in page 140, he writes thus: "We seem led to the conclusion that Jupiter is still a glowing mass. . . ." Two pages onward he remarks: "He (Jupiter) is not an incandescent body;" and then after he has given his own opinion, that Jupiter is still . . . "fluid probably throughout, and seething with the intensity of primæval fires, . . ." he forthwith falls foul of the late accomplished Dr. Whewell, in terms such as these: (p. 145) . . . "Surely no astronomer, worthy of the name, can regard this grand orb as the cinder-centered globe of watery matter, so contemptuously dealt with by one who, be it remembered thankfully, was not an astronomer." Our readers will probably feel that such language is to be regretted, and is alike unworthy of Mr. Proctor, and inapplicable to Dr. Whewell.

We have been induced to select the foregoing passages, because they are in fact typical of the style in which Mr. Proctor's volume is written. Laplace, the elder and the younger Herschel, Humboldt, Admiral Smyth, Sir William Thomson, Mr. Tait, Dr. Balfour Stewart, Professor Tyndall, and other honoured names, all in their turn come under Mr. Proctor's adverse criticism with greater or less severity. Mr. Lockyer is the object of our author's especial censure; simply because his opinions do not square with those of our author on the nature of the solar corona visible during a total eclipse, and on which subject wise astronomers confess their profound ignorance, therefore Mr. Lockyer's opinion is condemned as "erroneous," which it may or may not be, and Mr. Lockyer himself is represented as impeding the progress of science! This strong and repeated reference to what our author regards as the scientific peccadillos of an eminent observer, seems to us all the more unnecessary, from the fact, of which Mr. Proctor must be well aware, that one main purpose of the proposed British expedition to view the forthcoming solar